VALIDATION OF IMPRINTED GENES ON HUMAN CHROMOSOME 6 EXPRESSED IN THE PLACENTA

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One of the most critical health issues facing women and children is pre-term birth. A major cause of pre-term birth is poor placentation, which results in inadequate blood flow and nutrient transfer to the developing fetus. Genomic imprinting is an epigenetic mechanism that results in allele-specific expression (ASE) that is dependent on the parent of origin. Imprinted genes are critical for placental development and Loss of imprinting (LOI) is associated with aberrant placentation and adverse pregnancy outcomes, such as preterm birth, preeclampsia, and intrauterine growth restriction. LOI refers to re-expression of the silenced allele, which appears to occur in a developmental stage-specific manner in human placenta. Our goal is to better define the set of imprinted genes in the placenta, which would provide the framework for identifying epigenetic mechanisms that are important in human placental development. Imprinted genes are frequently located in clusters on chromosomes. This project will test whether several genes located near two known imprinted genes, *PLAGL1* and *HYMAI* (non-coding RNA), on chromosome 6 are imprinted in the human placenta. The genes that will be examined are *PHACTR2*, *STX11, LTV1, C6orf94,* and *SF5B3*. Our approach involves real-time qPCR and high resolution melt (HRM) analysis for genotyping and determining the relative expression of the maternal and paternal alleles in heterozygous placentas. We have identified several informative single nucleotide polymorphisms (SNPs) with minor allele frequencies >0.1 that are located in the transcribed region of *PLAGL1,* rs36120645 and rs2076684; *HYMAI*, rs28364590 and rs12524155; *PHACTR2,* rs10447447 and rs3734226; and *STX1,* rs3734227. PCR assays have been designed and optimized for HRM and qPCR assays. Current efforts are in identifying placental DNA samples for heterozygosity of each gene. Future endeavors will examine ASE from each gene, and test whether monoallelic expression is parent-of-origin specific.

Project funded by the IUPUI Undergraduate Research Opportunities Program (UROP).